

ASME B18.2.1

Hex cap screws - inch series (Table 6 profile)



Standard	ASME B18.2.1		
Product Type	Dimensional requirements for nine inch-series bolt and screw product types.		
Material	Carbon Steel		
Property Class	Grade 5, Grade 8		
Surface Finish	Zinc Plated, Blackened, Plain		
Size Range	1/4-20 UNC - 1-1/2-12 UNF	Length Range	1-16 mm
Thread	Unified inch UNC / UNF		

BASIS OF SPECIFICATION

WHICH STANDARD GOVERNS WHAT

Dimensions to	ASME B18.2.1-2012 (R2021)
Carbon steel / Alloy steel mechanical properties to	SAE J429
Stainless steel mechanical properties to	ASTM F593

MECHANICAL PROPERTIES

REQUIRED VALUES PER ISO 898-1

Class	Rm min.	Yield requirement	Elongation requirement	Hardness	Source
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Property classes Grade 5, Grade 8 are supplied to this standard; their requirement values are not tabulated here. Refer to the standard.

DIMENSIONAL DATA - SIZES WE SUPPLY

ALL DIMENSIONS PER THE STANDARD

Same for every size listed: Thread Class: 2A

Nominal Size	Basic Major Diameter - in	TPI Threads Per Inch	Thread Series	E max Body Diameter Max - in	E min Body Diameter Min - in	F (max) Width Across Flats - in	F (min) Width Across Flats - in	G (min) Width Across Corners - in	G (max) Width Across Corners - in	H Nominal Head Height - in	H (min) Head Height - in	J (min) Wrenching Height - in	LT (L≤6 in) Nominal Thread Length - in	LT (L>6 in) Nominal Thread Length - in
1/4-20 UNC	0.25	20	UNC	0.25	0.245	0.438	0.428	0.488	0.505	0.163	0.15	0.106	0.75	1
5/16-18 UNC	0.3125	18	UNC	0.3125	0.3065	0.5	0.489	0.557	0.577	0.211	0.195	0.14	0.875	1.125
3/8-16 UNC	0.375	16	UNC	0.375	0.369	0.562	0.551	0.628	0.65	0.243	0.226	0.16	1	1.25
7/16-14 UNC	0.4375	14	UNC	0.4375	0.4305	0.625	0.612	0.698	0.722	0.291	0.272	0.195	1.125	1.375
1/2-13 UNC	0.5	13	UNC	0.5	0.493	0.75	0.736	0.84	0.866	0.323	0.302	0.215	1.25	1.5
5/8-11 UNC	0.625	11	UNC	0.625	0.617	0.938	0.922	1.051	1.083	0.403	0.378	0.269	1.5	1.75
3/4-10 UNC	0.75	10	UNC	0.75	0.741	1.125	1.1	1.254	1.299	0.483	0.455	0.324	1.75	2
7/8-9 UNC	0.875	9	UNC	0.875	0.866	1.312	1.285	1.465	1.516	0.563	0.531	0.378	2	2.25
1-8 UNC	1	8	UNC	1	0.99	1.5	1.469	1.675	1.732	0.627	0.591	0.416	2.25	2.5

FURTHER SIZES IN THIS STANDARD

ALL DIMENSIONS PER THE STANDARD

Not held in stock. Available to order; minimum order quantity applies.

Nominal Size	Basic Major Diameter - in	TPI Threads Per Inch	Thread Series	E max Body Diameter Max - in	E min Body Diameter Min - in	F (max) Width Across Flats - in	F (min) Width Across Flats - in	G (min) Width Across Corners - in	G (max) Width Across Corners - in	H Nominal Head Height - in	H (min) Head Height - in	J (min) Wrenching Height - in	LT (L≤6 in) Nominal Thread Length - in	LT (L>6 in) Nominal Thread Length - in
1/4-28 UNF	0.25	28	UNF	0.25	0.245	0.438	0.428	0.488	0.505	0.163	0.15	0.106	0.75	1
5/16-24 UNF	0.3125	24	UNF	0.3125	0.3065	0.5	0.489	0.557	0.577	0.211	0.195	0.14	0.875	1.125
3/8-24 UNF	0.375	24	UNF	0.375	0.369	0.562	0.551	0.628	0.65	0.243	0.226	0.16	1	1.25
7/16-20 UNF	0.4375	20	UNF	0.4375	0.4305	0.625	0.612	0.698	0.722	0.291	0.272	0.195	1.125	1.375
1/2-20 UNF	0.5	20	UNF	0.5	0.493	0.75	0.736	0.84	0.866	0.323	0.302	0.215	1.25	1.5
9/16-12 UNC	0.5625	12	UNC	0.5625	0.5545	0.812	0.798	0.91	0.938	0.371	0.348	0.25	1.375	1.625
9/16-18 UNF	0.5625	18	UNF	0.5625	0.5545	0.812	0.798	0.91	0.938	0.371	0.348	0.25	1.375	1.625
5/8-18 UNF	0.625	18	UNF	0.625	0.617	0.938	0.922	1.051	1.083	0.403	0.378	0.269	1.5	1.75
3/4-16 UNF	0.75	16	UNF	0.75	0.741	1.125	1.1	1.254	1.299	0.483	0.455	0.324	1.75	2
7/8-14 UNF	0.875	14	UNF	0.875	0.866	1.312	1.285	1.465	1.516	0.563	0.531	0.378	2	2.25
1-12 UNF	1	12	UNF	1	0.99	1.5	1.469	1.675	1.732	0.627	0.591	0.416	2.25	2.5
1-1/8-7 UNC	1.125	7	UNC	1.125	1.114	1.688	1.631	1.859	1.949	0.718	0.658	0.461	2.5	2.75
1-1/8-12 UNF	1.125	12	UNF	1.125	1.114	1.688	1.631	1.859	1.949	0.718	0.658	0.461	2.5	2.75
1-1/4-7 UNC	1.25	7	UNC	1.25	1.239	1.875	1.812	2.066	2.165	0.813	0.749	0.53	2.75	3
1-1/4-12 UNF	1.25	12	UNF	1.25	1.239	1.875	1.812	2.066	2.165	0.813	0.749	0.53	2.75	3
1-3/8-6 UNC	1.375	6	UNC	1.375	1.363	2.062	1.994	2.273	2.382	0.878	0.81	0.569	3	3.25
1-3/8-12 UNF	1.375	12	UNF	1.375	1.363	2.062	1.994	2.273	2.382	0.878	0.81	0.569	3	3.25
1-1/2-6 UNC	1.5	6	UNC	1.5	1.488	2.25	2.175	2.48	2.598	0.974	0.902	0.64	3.25	3.5
1-1/2-12 UNF	1.5	12	UNF	1.5	1.488	2.25	2.175	2.48	2.598	0.974	0.902	0.64	3.25	3.5

TECHNICAL SPECIFICATIONS

Property Class	Grade 5, Grade 8	Surface Finish	Zinc Plated, Blackened, Plain
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MARKING
Steel — Required

What	Grade symbols and source (manufacturer or private label distributor) symbols as required by the applicable specification for the material, mechanical or performance requirements (Clauses 2.12.2 and 2.12.3)
Where	Not fixed by this Standard. Raised or indented at the manufacturer's option; raised marks may exceed the maximum head height by no more than 0.015 in. (5/8 in. and smaller) or 0.030 in. (larger); indented marks shall not reduce load-carrying capacity (Clause 2.12.1)
Sizes	All sizes
Clause	ASME B18.2.1-2012, 2.12 Identification

"Each of the products included in this Standard shall be marked in accordance with the requirements of the applicable specification for its material, mechanical, or performance requirements."

Stainless steel — Required

What	Grade symbols and source (manufacturer or private label distributor) symbols as required by the applicable specification for the material, mechanical or performance requirements (Clauses 2.12.2 and 2.12.3)
Where	Not fixed by this Standard. Raised or indented at the manufacturer's option; raised marks may exceed the maximum head height by no more than 0.015 in. (5/8 in. and smaller) or 0.030 in. (larger); indented marks shall not reduce load-carrying capacity (Clause 2.12.1)
Sizes	All sizes
Clause	ASME B18.2.1-2012, 2.12 Identification

"Each of the products included in this Standard shall be marked in accordance with the requirements of the applicable specification for its material, mechanical, or performance requirements."

Clause 2.12 of ASME B18.2.1-2012 sets no marking symbol of its own: grade and source markings follow the specification the order names for material and mechanical properties (ASTM A307, A354, A449, SAE J429, ASTM F593, F468, A193 or A320, per Clauses 3.8, 4.9 and 5.8).

Clause 2.12.1 limits raised markings to 0.015 in. above the maximum head height for 5/8 in. and smaller, and 0.030 in. for larger sizes; indented markings shall not reduce the load-carrying capacity.

Clause 2.11.1 fixes the designation order: product name, nominal size, threads per inch (omitted for lag screws), length, material including its specification, and protective finish if required.

Confirm the ordered property class before production.

INSPECTION DOCUMENTS WE CAN ISSUE

EN 10204 3.1 material certificate	Can be included when agreed in the order.
Dimensional inspection report	Can be provided for the agreed inspection scope.
Certificate of conformity	Can be issued against the confirmed order requirements.
Mechanical test report	Available when the required tests are agreed before production.
Chemical analysis report	Available when the material verification scope is agreed.
Coating inspection report	Can record the coating checks agreed for the order.

REFERENCES & NOTES

Note: Dimensional values follow the selected execution standard. Material properties and batch test results are included only when declared or supported by the applicable certificate or test report.